

### **REMARKS**

This paper is responsive to any paper(s) indicated above, and is responsive in any other manner indicated below.

### **EXAMINER INTERVIEW ACKNOWLEDGED AND STATEMENT OF SUBSTANCE**

This paper is (at least partially) responsive to the examiner interview conducted 09 September 2008, by and between (as indicated on the Interview Summary document) assigned Examiner Ram N. Kackar and attorney Paul J. Skwierawski, in the present application. It is respectfully submitted that the statement(s) regarding the "Substance of Interview", and all other information, as set forth within the Interview Summary document is accurate and is herein adopted by Applicant. Further to the above, any foregoing amendments may include amendments discussed during, or resultant from, the examiner interview, and the following includes a reiteration of discussions/arguments had during the examiner interview.

### **EXTENSIVE PROSECUTION NOTED**

Applicant and the undersigned respectfully note the extensive prosecution which has been conducted to date with the present application, and thus Applicant

and the undersigned would gratefully appreciate any considerations or guidance from the Examiner to help move the present application quickly to allowance.

### EARLY NOTIFICATION OF APPEAL

Unless significant prosecution progress is made responsive to this paper, Applicant respectfully puts the Examiner on notice that Applicant intends to move this application onward to appeal for the purpose of having Board review the application and provide independent analysis.

### PENDING CLAIMS

Claims 1-2, 5-6, 10-11, 14-20 and 23-25 were pending in the application, after entry of Applicant's 31 October 2008 Amendment. At entry of this paper, Claims 1-2, 5-6, 10-11, 14-20 and 23-25 remain pending for further consideration and examination in the application.

### 35 USC '112, 1<sup>ST</sup> PARAGRAPH REJECTION - TRAVERSED

Claims 1-2, 5-6, 10-11, 14-20 and 23-25 have been rejected, under 35 USC '112, first paragraph, for the concerns listed within the section numbered "2" on page 2 of the Office Action, i.e., as allegedly failing to comply with the written description requirement. Traversal is appropriate

MPEP 2163 (directed to "written description" guidelines) itself, explicitly states "...**there is no *in haec verba* requirement**..." (i.e., "in the same words" requirement) with respect to "written description", and continues to state simply that "...newly added claim limitations must be supported in the specification through

**express, implicit, or inherent disclosure.**" MPEP 1302.02 states (in relevant part) "...that exact terms need not be used *in haec verba* to satisfy the written description requirement of the first paragraph of 35 U.S.C. 112." MPEP 2163 states two other guidelines of relevance to the present rejection, i.e., "To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that **one skilled in the art** can reasonably conclude that the inventor **had possession** of the claimed invention", and secondly, "**...the PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not have recognized in the disclosure a description defined by the claims.**" Here, the Office Action comments have supplied only a bare (albeit partially bolded) quotation of Applicant's claim limitations, with no accompanying evidence or reasons. Accordingly, it is respectfully submitted that the Examiner has not met his/her initial burden to support the "written description" rejection.

It is respectfully submitted that, in the present situation, the Examiner **could not adequately support the rejection**, because the Applicant's claimed features/limitations are implicitly and/or inherently disclosed within Applicant's specification sufficiently for a skilled artisan to conclude possession of the invention. More particularly, as further discussions, Applicant submits:

"**measured amount**" is supported, for example, at page 7, line 15, of Applicant's original specification, or page 12, lines 6-7 which states (in relevant part), "...acquires the **measured** ...**mask edge roughness amount**";

a monitored or measured "**undulated**" form of the edge roughness portion is supported, for example, at page 15, lines 7-10, of Applicant's original specification, or page 12, lines 6-7 which states (in relevant part), "...by **monitoring** an uneven or

undulated form of the edge roughness portion and Fourier-transforming the monitored uneven form, a spatial frequency of the uneven or undulated form can be obtained." Further, it is respectfully noted that Websters II New College Dictionary, copyright 1999, at page 1203, defines "undulate" as "...To give a wavelike appearance to ...To move in waves or with a wavelike or sinuous motion: ripple ...To have a wavelike appearance", and defines "undulation" as "A wavelike rising and falling or movement back and forth ...A wavy form, outline, or appearance." Even beyond the above-mentioned specification textual support, it is respectfully submitted that Applicant's FIGS. 3, 5A-C, 6 and 10A-B, clearly show an "undulated" edge roughness portion. Since these FIGS. are a top view of the mask (24; FIG. 3, for example), the undulated edge roughness portion (C; FIG. 3, for example) extends along (or represents) the vertical sidewalls of the mask. As a result of the foregoing, it is respectfully submitted that persons skilled in the art would have easily and definitively concluded that Applicant's was in possession of the "undulated" features/limitations of Applicant's claims;

"corrugation" is supported, for example, at page 14, lines 20-22, of Applicant's original specification, or page 12, lines 6-7 which states (in relevant part), "...the etching amount in the edge roughness portion is greatly affected by the degree of unevenness or corrugation in the roughness portion." Further, it is respectfully noted that Websters II New College Dictionary, copyright 1999, at page 254, defines "corrugation" as "The state of being corrugated", and defines "corrugate" as "To form or become formed into folds or parallel and alternating ridges and grooves." Even beyond the above-mentioned specification textual support, it is respectfully submitted that Applicant's FIGS. 3, 5A-C, 6 and 10A-B, clearly show a "corrugated" edge

roughness portion. Since these FIGS. are a top view of the mask (24; FIG. 3, for example), the corrugated edge roughness portion (C; FIG. 3, for example) extends along (or represents) the vertical sidewalls of the mask. As a result of the foregoing, it is respectfully submitted that persons skilled in the art would have easily and definitively concluded that Applicant's was in possession of the "corrugated" features/limitations of Applicant's claims.

Based upon the foregoing, reconsideration and withdrawal of the above-referenced rejection are respectfully requested. If the Examiner continues such rejection, the Examiner should provide "**evidence or reasons why persons skilled in the art would not have recognized in the disclosure a description defined by the claims**", as required by MPEP 2163.

### **35 USC '112, 1<sup>ST</sup> PARAGRAPH REJECTION - TRAVERSED**

Claims 1-2, 5-6, 10-11, 14-20 and 23-25 have been rejected, under 35 USC '112, first paragraph, for the concerns listed within the section numbered "4" on page 4 of the Office Action. Traversal is appropriate, because the Office Action listed feature was sufficiently described/taught within Applicant's original disclosure. More particularly, page 14, line 26, through page 15, line 6, together with Applicant's FIG. 6, clearly discloses and adequately explains (for persons skilled in the art), a formula for an amount of line edge corrugation

Based upon the foregoing, reconsideration and withdrawal of the above-referenced rejection are respectfully requested.

### **REJECTION(S) UNDER 35 USC '103**

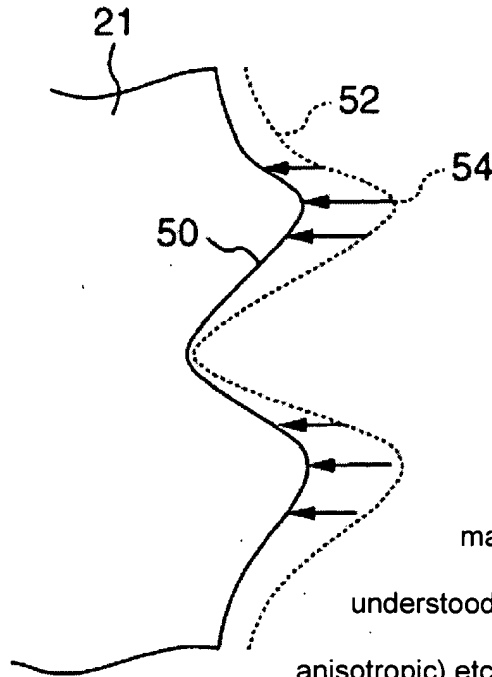
See 31 October 2008 Amendment arguments, which are incorporated herein by reference. As additional arguments, Applicant respectfully submits the following.

More particularly, in order to understand a difference between the Rauf teachings and Applicant's disclosed and claimed invention, one must understand the difference between edge perimeter undulations (or corrugations), and just generalized surface roughness (small localized bumps and cavities). Applicant's FIGS. 5A and 5C, additional FIGS supplied herewith, and Rauf's FIGS., will be used to explain.

[continued next page]

First, Applicant's original **FIG. 5A** (reproduced herewith for convenience)

**FIG.5A**



illustrates a top view of a very small portion of a mask **21** having (for simplicity sakes) only a few undulations (or corrugations) along edge perimeter **50**. This type of undulations (or corrugations) may be generally caused by physical vibrations and/or light (e.g., laser) flickering which is encountered during the original light exposure of the mask. It is respectfully submitted that it is

understood in the art, that if generalized (mainly anisotropic) etching generalized etching is applied to this

type of undulated (or corrugated) mask, then the undulations (or corrugations)

provided along the edge perimeter

will result in vertical striations extending

vertically along a sidewall of mask and

underlying etched structure. Such vertical

striations may be most clearly seen within a

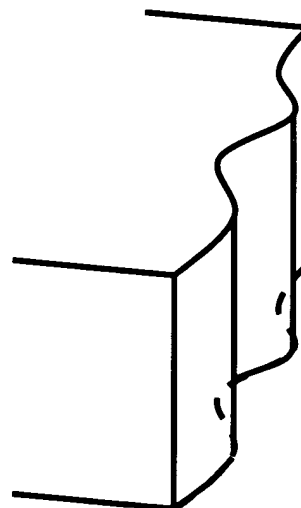
perspective view of the resultant etched

structure, as shown in the **FIG. P** to the right.

Applicant's disclosed and claimed invention is

directed toward reducing a degree of edge

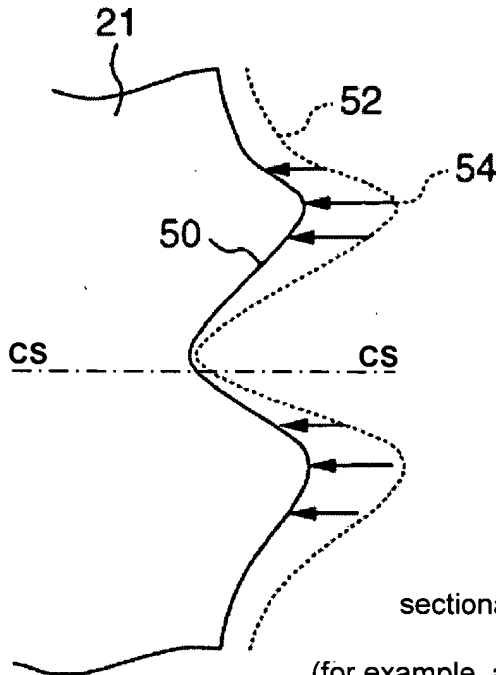
perimeter undulations (or corrugations) and resultant striations.



**FIG. P**

In contrast, **Rauf** is directed toward just generalized surface roughness

## FIG. 5A



(small localized bumps and cavities).

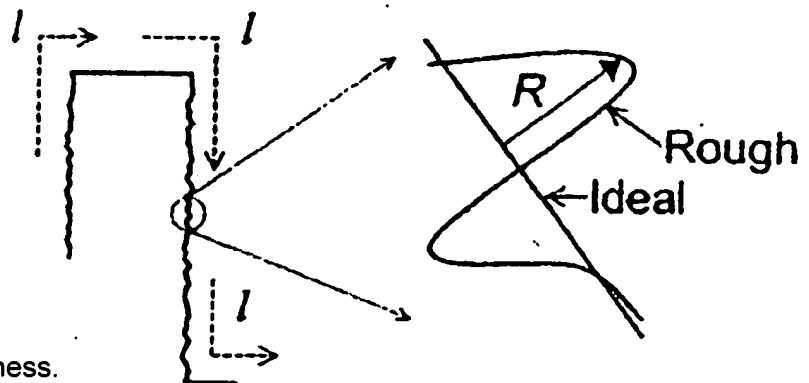
Generalized surface roughness may be caused for example, by material imperfections or inconsistencies within the mask materials itself, and may be illustrated and understood as follows. More particularly, if one were to assume that Applicant's FIG. 5A's (reproduced again herewith) mask 21 was a narrow mask having a left edge in addition to the illustrated right edge 50, and then if one were to take a cross-

sectional view anywhere along Applicant's FIG. 5A mask

(for example, along the line CS-CS added herein to FIG. 5A),

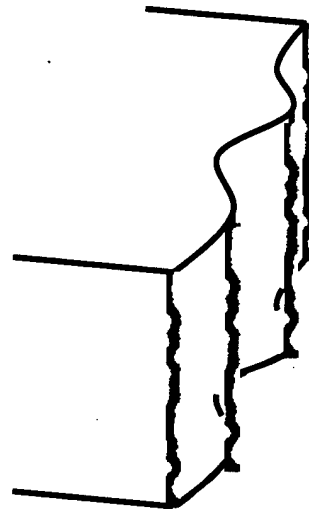
then one would get a cross-sectional view like that of Rauf's FIG. 1 (reproduced herewith for convenience). Of particular interest, the irregularities (i.e., the roughness) of Rauf's FIG. 1 vertical lines are illustrative of miniature localized "bumps" and "cavities" on a

surface of the vertical mask sidewalls. See Rauf's page 657, left column, center to the end of the column; see also Rauf's FIG. 3 concerning plotting regarding surface roughness.





If one were to modify the above-presented **FIG. P** perspective view to include the "bumps" and "cavities" of Rauf, then a modified **FIG. P'** may be as shown. From such **FIG.**, it can be seen that there is a vast difference between Applicant's edge perimeter undulations (or corrugations) and Rauf's "bump" and "cavity" surface roughness.

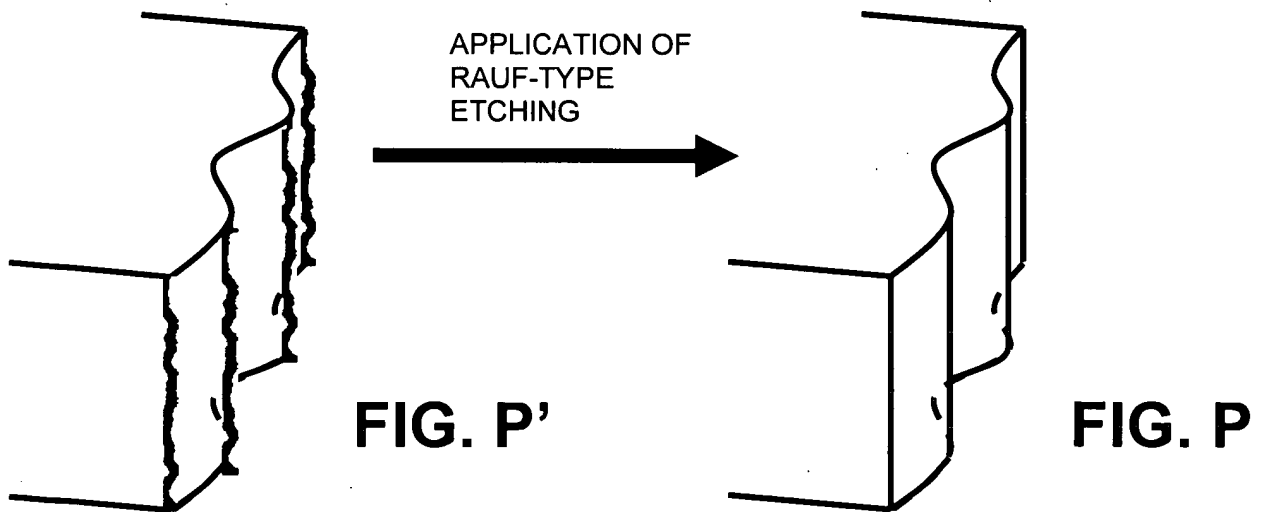


**FIG. P'**

It is respectfully noted, at this point, that Rauf's own disclosure explicitly disclaims applying its teachings to treating striations (caused by edge perimeter undulations (or corrugations)). More particularly, Rauf's page 656, right column, lines 10-13, state: "Please note that roughness introduced by imperfections in mask and optical image generally leads to vertical striations and the two-dimensional model considered in this article will not apply to this type of roughness."

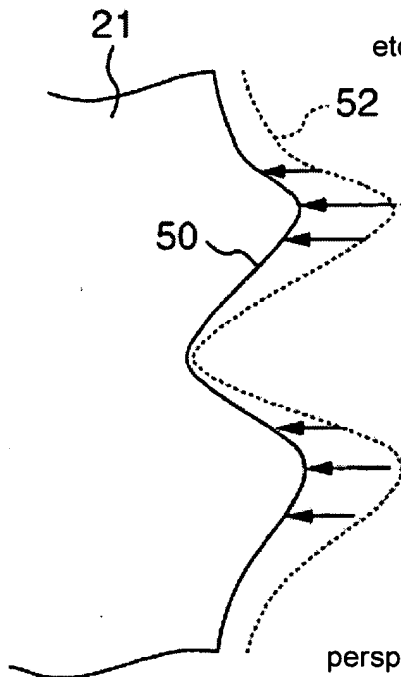
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Accordingly, given that Rauf's own disclosure disclaims treating striations (caused by edge perimeter undulations (or corrugations)), it is respectfully submitted that, at best, Rauf (taken by itself, or with the Kagoshima reference) would only teach applying sufficient etching to remove only the miniature localized "bumps" and "cavities" on a surface of the vertical mask sidewalls, and the striations would remain. A before-and-after comparison of perspective views of such etching result may be illustrated as follows. That is, one would only go from **FIG. P'** surface bump/cavity arrangement to the **FIG. P** non-bumped/cavities arrangement, ...but the striations would still exist.



In contrast, Applicant's disclosed and claimed invention is directed toward reducing a degree of lower frequency undulations (or corrugations) and resultant striations along the edge perimeter. Applicant's FIG. 5A (along with its

FIG.5A



accompanying specification description) describes

how control of radicals can be used to selectively

etch the peak portions 54 of the original edge

perimeter 52 to transition toward improved edge

perimeter 50. By monitoring and

controlling a degree of radicals within the  
plasma and a timing (i.e., period) of plasma

application, eventually the selective etching will

result in FIG. 5C's improved edge perimeter

having hardly any residual undulation (or

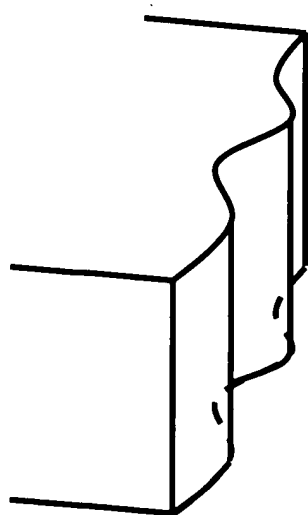
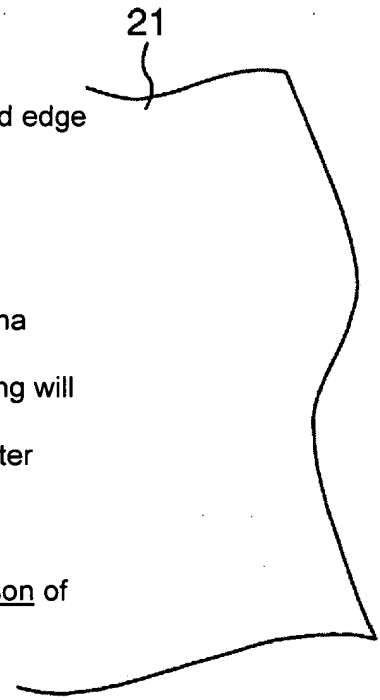
corrugation). A before-and-after comparison of

perspective views of such etching result may be

illustrated as follows. That is, one would go from FIG. P's

heavily striated arrangement to the FIG. P'' greatly-reduced-striation arrangement.

FIG.5C



APPLICANT'S  
CONTROL AND  
ETCHING



FIG. P

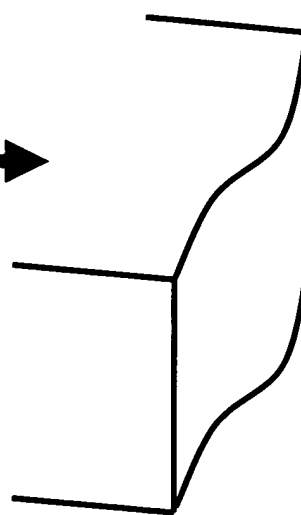


FIG. P''

In short, Applicant's disclosed and claimed invention is specifically directed to undulation (or corrugation) and striation etching reduction, while **Rauf's own disclosure explicitly disclaims applying its teachings to treating striations** (caused by edge perimeter undulations (or corrugations)). It is respectfully submitted that Rauf's disclaiming is akin to teaching away from Applicant's invention.

Continuing, claim 19 (taken as a dependent claim example) recites, "wherein the trimming condition calculating means automatically calculating the trimming condition **including both a line edge perimeter corrugation trimming time and a mask proper trimming time, wherein the line edge perimeter corrugation trimming time is directed to lessening the amount of the line edge perimeter corrugation of the patterned mask, and the mask proper trimming time is directed to lessening a width of a major body of the patterned mask**; and wherein the trimming treatment is carried out for the trimming condition **including the line edge perimeter corrugation trimming time and the mask proper trimming time**, calculated by said trimming condition calculating means." Support for such timings may be found within Applicant's specification beginning at page 15, line 22 through page 16, last line.

Again rebutting the Rauf et al. reference, such reference is deficient in not teaching the separate timings utilized within Applicant's claimed trimming condition. Especially given the fact that Rauf et al. does not address line edge corrugation.

No other applied reference cures the major deficiencies mention above with respect to the Rauf et al. reference. Accordingly, it is respectfully submitted that the previously-applied references, whether taken individually, or in combination, would not have disclosed or suggested Applicant's claimed invention.

As a result of all of the foregoing, it is respectfully submitted that the applied art (taken alone and in the Office Action combinations) would not support a '103 obviousness-type rejection of Applicant's claims. Accordingly, reconsideration and withdrawal of such '103 rejection, and express written allowance of all of the '103 rejected claims, are respectfully requested.

#### **EXAMINER INVITED TO TELEPHONE**

The Examiner is herein invited to telephone the undersigned attorneys at the local Washington, D.C. area telephone number of 703/312-6600 for discussing any Examiner's Amendments or other suggested actions for accelerating prosecution and moving the present application to allowance.

#### **RESERVATION OF RIGHTS**

It is respectfully submitted that any and all claim amendments and/or cancellations submitted within this paper and throughout prosecution of the present application are without prejudice or disclaimer. That is, any above statements, or any present amendment or cancellation of claims (all made without prejudice or disclaimer), should not be taken as an indication or admission that any objection/rejection was valid, or as a disclaimer of any scope or subject matter. Applicant respectfully reserves all rights to file subsequent related application(s) (including reissue applications) directed to any/all previously claimed limitations/features which have been subsequently amended or cancelled, or to any/all limitations/features not yet claimed, i.e., Applicant continues (indefinitely) to

maintain no intention or desire to dedicate or surrender any limitations/features of subject matter of the present application to the public.

### **CONCLUSION**

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR '1.136. Authorization is herein given to charge any shortage in the fees, including extension of time fees and excess claim fees, to Deposit Account No. 01-2135 (Case No. 500.43597X00) and please credit any excess fees to such deposit account.

Based upon all of the foregoing, allowance of all presently-pending claims is respectfully requested.

Respectfully submitted,

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